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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/965,630	09/27/2001	Jason K. Shiepe	PES-0043	2487
23462	7590	05/03/2004	EXAMINER	
CANTOR COLBURN, LLP			CREPEAU, JONATHAN	
55 GRIFFIN ROAD SOUTH			ART UNIT	
BLOOMFIELD, CT 06002			PAPER NUMBER	

1746

DATE MAILED: 05/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/965,630

Applicant(s)

SHIEPE ET AL.

Examiner

Jonathan S. Crepeau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) 26-39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-25 and 40-51 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 3/11, 8/1, 11/25.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-25 and 40-51, drawn to an electrochemical cell system, classified in class 429, subclass 39.
 - II. Claims 26-39, drawn to a method of making a porous flow field member, classified in class 427, subclass 115.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the process of Group II does not have to make the product of Group I because the support members of Group II may be used in applications other than electrochemical cells.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
4. During a telephone conversation with Pamela Curbelo on April 26, 2004 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-25 and 40-51. Affirmation of this election must be made by applicant in replying to this Office action. Claims

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26-39 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Objections

6. Claims 21, 22, and 23 are objected to because of the following informalities: in claim 21, line 2, "cloth." should be "cloth,"; in the last line of claim 22, "seconed" should be "second"; in claim 23, "elactomeric" should be "elastomeric." Appropriate correction is required.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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8. Claims 1, 2, 5-7, 11, 40, 41, 45, 48, and 50 are rejected under 35 U.S.C. 102(b) as being anticipated by Wilson (U.S. Patent 5,641,586). Regarding claims 1, 40, 45, and 50, the reference teaches a fuel cell comprising first and second electrodes, an electrolyte membrane, first and second flow fields (12), and a porous flow field member (24) in fluid communication with the first flow field (see Fig. 1B). The member comprises a porous support modified to provide hydrophilicity or hydrophobicity (see col. 4, line 46 et seq). Regarding claims 2, 5, 6, and 7, the support is made of electrically conductive carbon and a polymer (i.e., NAFION® or FEP [fluorinated ethylene propylene]) (col. 4, line 54 et seq). Regarding claim 11, the member has a porosity (i.e., void volume) of at least 60% (col. 3, line 30). Regarding claims 40, 41, and 48, the member may also comprise a metal cloth or screen support, which may be sintered (see col. 5, line 10).

Thus, the instant claims are anticipated.

9. Claims 1, 2, 5-7, 9, 10, 18, 19, 45-47 and 50 are rejected under 35 U.S.C. 102(b) as being anticipated by Wilson (U.S. Patent 5,952,119). Regarding claims 1, 40, 45, and 50, the reference teaches a fuel cell comprising first and second electrodes, an electrolyte membrane, first and second flow fields (22, 28), and porous flow field members (32, 24) in fluid communication with the flow fields (see Fig. 1). The member comprises a porous support modified to provide hydrophilicity or hydrophobicity (see col. 4, line 10 et seq). Regarding claims 2, 5, 6, 10, 46, and 47, the supports can be made of electrically conductive carbon cloth and a polymer (i.e.,

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PTFE) (col. 4, line 10 et seq). Regarding claims 7, 9, and 10, a hydrophilic NAFION®-coated polyester thread is threaded through the support (see col. 4, line 6; col. 5, line 47). Regarding claims 18 and 19, the support may be catalyzed with platinum catalyst (see col. 4, line 31 et seq.).

Thus, the instant claims are anticipated.

10. Claims 1, 2, 5-7, 12, 15, 45-47, 49, and 50 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 97/13287. Regarding claims 1, 40, 45, 49, and 50, the reference teaches a fuel cell comprising first and second electrodes, an electrolyte membrane, first and second flow fields (17), and porous flow field members (16) in fluid communication with the flow fields (see Figs. 2 and 8). The member comprises a porous support modified to provide hydrophilicity or hydrophobicity. Regarding claims 2, 5, 6, 7, 46, and 47, the support can be made of electrically conductive carbon cloth and a polymer (i.e., PTFE or ion exchange resin) (col. 12, line 1 et seq.). Regarding claims 12 and 15, the member comprises two layers (18, 16), each having a different porosity (see col. 10, line 32 et seq.). Thus, regarding claim 49, the member has a porosity gradient.

Thus, the instant claims are anticipated.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 3, 4, 22-25 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/13287.

The reference is applied to claims 1, 2, 5-7, 12, 15, 45-47, 49, and 50 for the reasons stated above. Further, regarding claim 25, the reference teaches that the supports may comprise a titanium-based compound (see page 12, line 10).

However, the reference does not expressly teach that three porous supports are present, each with increasing porosity, as recited in claims 22-24, or the weight percentages of the components in the supports, as recited in claims 3 and 4.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of WO '287 to use three supports in the fuel cell. On page 10, line 34, the reference teaches that "the porous layer (16) is a layer of an electrically conductive porous material having at least two portions with different mean pore sizes." This disclosure fairly suggests that the porous member may have more than two layers. As such, it would have been obvious to use a third support in the member in the fuel cell of WO '287, such support having a larger porosity than the second support (note teachings of increasing porosity on page 14, line 18 et seq.). It is

further noted that the duplication of parts is generally not considered to distinguish over a reference (MPEP §2144.04).

Regarding the weight percentages of the components in the supports as recited in claims 3 and 4, the artisan would be sufficiently skilled to manipulate the amount of carbon and polymer in each layer so as to affect the electrical conductivity, hydrophilicity, and hydrophobicity of the resulting layer (see page 13, line 36). It has been held that the discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980). As such, the ranges recited in claims 3 and 4 are not considered to distinguish over the reference.

13. Claims 8, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson '586.

The reference is applied to claims 1, 2, 5-7, 11, 40, 41, 45, 48, and 50 for the reasons stated above. However, the reference does not expressly teach that the metal cloth or screen comprises nickel or steel, as recited in the instant claims.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use nickel or steel in the member of Wilson '586. As would be appreciated by the artisan, these materials

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have characteristics such as high strength and high oxidation resistance. As such, it would be obvious to use these materials in the cloth or screen of Wilson '586.

14. Claims 13, 14, 16, 17, and 40-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/13287 in view of Wilson '586.

WO '287 is applied to claims 1, 2, 5-7, 12, 15, 45-47, 49, and 50 for the reasons stated above.

WO '287 does not expressly teach that the porous supports comprise metal screens or sintered metal cloths, as recited in the instant claims.

As noted above, Wilson '586 teaches these structures as supports in porous members for fuel cells.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the structures of Wilson '586 in the fuel cell of WO '287. The disclosure of Wilson '586 indicates that metal screens and sintered metal cloths are functionally equivalent to carbon cloths when used in porous current-collecting members for fuel cells. As such, it would be obvious to substitute the metal screens or sintered metal cloths of Wilson '586 for the carbon paper of WO '287. An express suggestion to substitute one equivalent component or process for another is not

necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06.

15. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/13287 as applied to claims 3, 4, 22-25 and 51 above, and further in view of Wilson '586.

WO '287 does not expressly teach that the porous supports comprise metal screens or sintered metal cloths, as recited in the instant claims.

As noted above, Wilson '586 teaches these structures as supports in porous members for fuel cells.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the structures of Wilson '586 in the fuel cell of WO '287. The disclosure of Wilson '586 indicates that metal screens and sintered metal cloths are functionally equivalent to carbon cloths when used in porous current-collecting members for fuel cells. As such, it would be obvious to substitute the metal screens or sintered metal cloths of Wilson '586 for the carbon paper of WO '287. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06.

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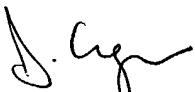
Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Dufner et al (U.S. Patent 6,024,848), which is concerned with porous members between electrodes and flow fields.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (571) 272-1302. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonathan Crepeau
Patent Examiner
Art Unit 1746
April 28, 2004